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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,781	03/20/2007	Joachim Kroos	KROOS	1412

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EXAMINER	
KERNS, KEVIN P	
ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/596,781	KROOS ET AL.	
	Examiner	Art Unit	
	Kevin P. Kerns	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-17 and 19-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-17 and 19-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 2-17 and 19-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spitzer et al. ("Direct Strip Casting (DSC) – An Option for the Production of New Steel Grades" – provided by applicants in the IDS dated March 20, 2007) in view of Sivilotti et al. (US 6,755,236), and further in view of Bergeron et al. (US 4,588,021).

Regarding independent claim 24, Spitzer et al. disclose a method of making a hot strip in a direct strip casting (DSC) apparatus (pages 724-731), in which the method

comprises the steps of feeding a molten steel melt onto a strip casting unit via horizontal casting to obtain a pre-strip with a cast thickness of between 6-15 mm (page 724), and transferring the pre-strip for further processing, in which the strip has a composition of carbon of less than 1%, Al between 1-8%, Mn between 10-30%, and Si between 1-6% (page 727). Regarding the claimed ranges of carbon, Al, Mn, and Si, these elemental compositions are encompassed by comparatively broader and/or overlapping ranges disclosed by Spitzer et al. MPEP 2131.03 states, "When, as by a recitation of ranges or otherwise, a claim covers several compositions, the claim is 'anticipated' if *one* of them is in the prior art." *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). "When the prior art discloses the range which touches or overlaps the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation.". See MPEP 2131.03.

Regarding independent claim 24 (and to the degree that one of ordinary skill in the art would not recognize the claimed compositions to be "inherent" under 35 USC 102(b) above), one of ordinary skill in the art would have recognized the obviousness of the claimed ranges in view of Spitzer et al., as set forth in MPEP 2144.05. "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists.". *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Also, "A prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a *prima facie* case of obviousness.". *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003). See

MPEP 2144.05. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Regarding claims 2, 4, 5, 7, 9, 10, 13, 17, and 19-22, Spitzer et al. disclose a wide range of carbon, Al, Mn, and Si content to be used in the horizontal casting process. Although the Spitzer et al. reference is not specific with the claimed smaller ranges, it is within the disclosed range of the Spitzer et al reference. In this instance, one of ordinary skill in the art would have recognized the obviousness of the claimed ranges in view of Spitzer et al., as set forth in MPEP 2144.05. "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists.". *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Also, "A prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a *prima facie* case of obviousness.". *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003). See MPEP 2144.05. Also, it would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to find an optimum range through routine experimentation via process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Regarding claims 3, 6, 8, 11, 12, and 14-16, Spitzer et al. do not specifically disclose the contents of Cr and hydrogen in the steel. However, it would have been obvious to one of ordinary skill in the art to have these ranges of trace elements present in the cast steel product, since Spitzer et al. have found a workable range. As a result, one of ordinary skill in the art would have determined optimal ranges based on routine experimentation, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Regarding claims 23 and 25, Spitzer et al. do not specifically disclose deformation of the strip between 50-70%. However, Spitzer et al. disclose thinning (reduction) of the strip to reduce size of the final cast product. Therefore, deforming to 50-70% would have been obvious to one of ordinary skill in the art, since this would depend on design expediency. Also, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Spitzer et al. do not specifically disclose that the method of independent claim 24 further includes the steps of conditioning a top side of the conveyor band of the horizontal casting device by a targeted structuring of the top side to even out surface irregularities (including further details of the structuring steps set forth in dependent claims 26 and 27), and cooling the solidifying shell of a melt substantially equally across the width of the conveyor band.

However, Sivilotti et al. disclose a belt-cooling and guiding means for use in a process of horizontal continuous belt casting of metal strip (abstract; column 2, lines 38-67; column 3, lines 1-26; column 4, lines 1-10; column 5, lines 4-13 and 49-65; column 6, lines 39-67; column 7, lines 1-67; and Figures 1-3), in which the process includes the steps of providing a belt casting machine 10 (Figure 1) having heat-conducting casting belts 12 associated with continuous coolant slots 31 (Figure 2) in the support surfaces arranged transversely and substantially completely across one or both casting belts 12 (conveyor bands) to cause a uniform thickness and velocity of coolant flow, thus allowing for even cooling of the belts 12 in regions such as those adjacent the molten metal delivery region 15 and as the metal strip forms a solidifying shell around the melt (Figure 1). Although the coolant area is directed below the casting belts 12, the top side of the casting belts 12 (conveyor bands) would be cooled by coolant (when compared to the state of the conveyor bands in the absence of coolant), since the belts 12 are heat-conducting (column 5, lines 51-59). Moreover, Sivilotti et al. optionally provide a liquid belt dressing (column 5, lines 4-7) to the casting surfaces (adjacent the top side of the conveyor band 12) for cooling the top side of the belts 12 to assist in further cooling the surfaces of the melt forming a solidifying shell when casting alloys in thin sections and having a long freezing range along the casting belt (column 5, lines 10-13). These features are advantageous for avoiding the formation of internal and/or surface defects in the cast article that would be caused by lack of uniform cooling (abstract; column 2, lines 21-55; and column 5, lines 10-13).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the method of making a hot strip in a direct strip casting (DSC) apparatus via horizontal casting to obtain a pre-strip with a cast thickness of between 6-15 mm, as disclosed/suggested by Spitzer et al., by cooling a top side of the conveyor band of the horizontal casting device to cool all surface elements of the solidifying shell of a melt substantially equally across the width of the conveyor band, as taught by Sivilotti et al., in order to avoid the formation of internal and/or surface defects in the cast article that would be caused by lack of uniform cooling (Sivilotti et al.; abstract; column 2, lines 21-55; and column 5, lines 10-13).

Neither Spitzer et al. nor Sivilotti et al. discloses the step of conditioning a top side of the conveyor band of the horizontal casting device by a targeted structuring of the top side to even out surface irregularities (including further details of the structuring steps set forth in dependent claims 26 and 27).

However, Bergeron et al. disclose a method of continuous casting of molten metals (including steels) by using endless flexible metallic casting belts with a coating thereon (abstract; column 1, lines 8-18; column 2, lines 45-68; column 3, lines 1-8; column 4, lines 7-65; column 5, lines 1-36; column 8, lines 47-68; column 9, lines 1-9; column 11, lines 43-52; column 20, lines 9-22; column 21, lines 20-39; and Figures 3, 4, and 6), in which the method includes the steps of grit blasting ("sand" blasting of applicants' claim 26) of the surface of the casting belt with aluminum oxide (column 4, lines 12-16) and to obtain targeted structuring (nub structures in the micron size range of applicants' claim 26) of its top side to even out surface irregularities, and providing a

structured surface by applying a thermally insulating separation layer by thermal or plasma spraying (of powdered zirconia, silica, or alumina of applicants' claim 27) on the grit-blasted roughened belt surface (column 4, lines 57-59; column 5, lines 12-36; and column 8, lines 47-68), such that these additional steps are advantageous for dramatically increasing the life of the (protectively coated) belts while obtaining improved surface quality and metallurgical properties of the cast products (abstract; column 3, lines 2-8; and column 21, lines 20-39).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the method of making a hot strip in a direct strip casting (DSC) apparatus via horizontal casting to obtain a pre-strip with a cast thickness of between 6-15 mm, as disclosed/suggested by Spitzer et al., by cooling a top side of the conveyor band of the horizontal casting device to cool all surface elements of the solidifying shell of a melt substantially equally across the width of the conveyor band, as taught by Sivilotti et al., in order to avoid the formation of internal and/or surface defects in the cast article that would be caused by lack of uniform cooling, and by further using the targeted structuring (and details of the structuring steps) of the top side to even out surface irregularities, as disclosed by Bergeron et al., in order to dramatically increase the life of the (protectively coated) belts while obtaining improved surface quality and metallurgical properties of the cast products (Bergeron et al.; abstract; column 3, lines 2-8; and column 21, lines 20-39).

Response to Arguments

4. The examiner acknowledges the applicants' amendment provided with the request for continued examination received by the USPTO on February 18, 2010. The amendments overcome the prior objection to claim 24. The applicants have added new claims 26 and 27. Claims 2-17 and 19-27 are currently under consideration in the application.

5. Applicants' arguments with respect to claims 2-17 and 19-27 have been considered but are moot in view of the new ground(s) of rejection.

With regard to the applicants' remarks/arguments on pages 6-8 of the amendment, it is noted that the applicants have amended the "conditioning" step of independent claim 24 as (separate) "conditioning" and "cooling" steps, of which the "cooling" step is taught by Sivilotti et al. However, the "conditioning...by a targeted structuring" (of independent claim 24) and further details of the structuring step (of new claims 26 and 27) are disclosed by the newly applied Bergeron et al. reference. The newly underlined portions and the last three paragraphs in the above 35 USC 103(a) rejections section have been added to reflect all changes necessitated by amendments.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The Leconte et al., Theobald et al., and Roder et al. references are also cited in PTO-892 as teaching structuring (e.g. coating) of casting belt surfaces.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin P. Kerns whose telephone number is (571)272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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February 27, 2010